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IN EXSECTING THE APPENDIX.

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THE HÆMOSTATIC FORCEPS IN EXSECTING THE APPENDIX.

BY ALEXANDER J. C. SKENE, M. D.

FINDING that the treatment of the pedicle of ovarian tumors with compression and heat applied with the electric current gives infinitely the best results, I have employed the same method in appendicectomy with equally fortunate and gratifying results.

The advantages of this method over the ligature for controlling bleeding, in abdominal surgery especially, have been discussed in relation to ovariectomy and hysterectomy in the *New York Medical Journal*, March 27, 1897, but there remains much to be said in regard to the practice of the method in salpingectomy and appendicectomy. Professor Emil Ries, of Chicago, has given (see *American Gynecological and Obstetric Journal*, January, 1898) his unfavorable experience with the ligature in removal of the tubes and ovaries, and as my experience fully agrees with his I quote from his valuable essay. After noticing that Schauta and Chrobak report but little more than fifty per cent. of their laparotomy patients as really cured, Dr. Ries suggested that

one of the most important causes of these unsatisfactory results was to be found in the formation of stump exudates, and offers a new explanation of this cause in the following observation of several cases in which microscopical examination was made of the uterus removed some time after salpingectomy.

“Stump exudates were found by Schauta in twenty-eight cases out of his one hundred and seventy-two salpingo-oophorectomies. They have been found even more frequently by other observers, and in my own experience I have repeatedly found them to be at the bottom of troublesome symptoms months after the operation. They produce pain, sometimes so severe that the patient is unable to attend to her work; in some cases the pain is even worse than it was before the operation. The exudates are found around the stumps of the removed tubes, and vary in size from a barely palpable thickening of the uterine horn to the size of a hen’s egg or larger.

“As an explanation of the formation of these tumors, Schauta offered the following two possibilities:

“1. The inflammatory process creeps on through the uterine wall into the surrounding parametric and perimetritic tissue; and

“2. Germs were present in the broad ligament at the time of the operation (though no actual observations could be offered as evidence of this), the connective tissue of the broad ligament was laid bare by the operation, and in this way the germs could invade the peritonæum.

“Though these observations did not meet with any opposition, it can not be overlooked that we have no observations bearing out the correctness of these hypoth-

eses. Besides, I can not help feeling that they are very artificial.

“The cases are the following:

“CASE I.—Mrs. J., twenty-four years old. Seven months previously a left pus tube and ovary had been removed. A sinus remained which would not close. Besides, the patient has an ovarian abscess the size of a fist, and hydrosalpinx on the right side. Uterus adherent all over, forming part of the wall of the sinus. I operated September 28, 1896. Laparotomy. Removal of ovarian abscess, hydrosalpinx, uterus, excision of sinus, which leads toward the right crista ilii and terminates in an abscess, which contains five silk ligatures. Recovery:

“The stump of the tube which had been removed seven months previously is excised and examined in a series of sections embracing the entire stump up to the interstitial portion of the tube. *The cavity is open throughout.* The epithelium is the usual low columnar epithelium of this portion of the tube and stops at the surface of the stump without investing the cut surface of the stump. No threads to be found in the stump.

“CASE II.—Miss W., twenty-five years old. Several years ago removal of both tubes and right ovary. Now chronic pelviperitonitis and adherent retroflexion. Operation by Dr. W. H. Rumpf on December 8, 1896. Vaginal hysterectomy.

“Both tubal stumps are examined in series. *They are perfectly permeable,* though the cavity is very narrow. Epithelium well preserved up to the abdominal opening of the stump. Besides, the left tube contains some epithelial ducts outside the circular muscular layer of the tube, one of which enters the circular muscular layer itself, but does not show any communication with the tubal cavity (remnant of the Wolffian body). No threads to be found in the stump.”

These same unfavorable results are reported by A. Lapthorn Smith in his “experience of two hundred and

forty-nine abdominal sections" (*American Journal of Obstetrics*, No. 241, page 64). He has seen several cases from one to two years after the appendix had been removed, who were suffering from fæcal fistula or pericæcal abscess. This is the testimony of Armstrong also, who reported in the *British Medical Journal*, October 9, 1897, that fæcal fistula followed fifteen times in five hundred and forty-one cases. Smith very clearly proves that "because of the mucous glands which are imbedded in the mucous membrane of the appendix it is quite as unsurgical to put a ligature around the base of the appendix a quarter of an inch from the cæcum and then cut the appendix off as to propose to close an opening in the bowel by picking up the edges of the opening and tying a ligature around them, because this would simply bring mucous surfaces into contact, and, when the ligature has cut through or otherwise fallen off, the secreting glandular surface would separate and the contents of the bowel escape. Those who follow this method may say that they cauterize the mucous membrane after cutting off the appendix, and not only disinfect it but also destroy its secreting surface. But this, I maintain, is impossible for them to do, because they manifestly can not reach the mucous membrane brought together by the ligature, nor still less the part of it which lies below the ligature. If there were only one case of fæcal fistula instead of fifteen in five hundred it would be worth while preventing it.

"The ideal method, in my opinion, and which I have followed in these cases, is for an assistant to hold up the intestine an inch on each side of the appendix, and, after tying and cutting the meso-appendix, to snip the appendix off even with the cæcum. The hole in the

intestine is then sewed up with fine silk, care being taken to include only the muscular coat. A director is then pressed upon the line of the suture until it sinks below the surrounding surface, when another row of sutures brings the peritoneal surfaces together. Such a closure will almost surely unite by primary union, doing away with all danger of fæcal fistula or circumcæcal inflammation, by which the opening in the appendix is sometimes closed, and in which cases, although there is no fæcal fistula, the patient is subjected to a good deal of discomfort while Nature is throwing out a layer of plastic lymph to seal the defective closure. Some authors recommend the peeling off of the peritoneal coat of the appendix so as to form a cuff a quarter of an inch long, and then, after tying and cutting off the appendix in the manner which is condemned above, make up for the defect by sewing the peritonæum over the end of the stump. This is much better than leaving a sloughing stump free in the abdomen, but is by no means as good as the method advocated above, in which no stump at all is left, and nothing but a fine, thin line of Lembert suture, which we know gives absolutely no trouble."

This same method was fully described by Haggard, of Nashville, in a paper reported in the *Transactions of the Southern Surgical and Gynæcological Association* at the tenth annual meeting in St. Louis last November. He summed up the merits of this method as follows: "Total excision of the appendix, with closure of the hole in the head of the colon, was said to do away with the following dangers: (1) Subsequent perforation of the stump under the ligature from infection in its own cavity, (2) abscess of the wall of the cæcum from invagination of the infected stump, (3) continuance of in-

fect process from stricture in the stump between distal ligature and the proximal opening of appendix into the cæcum, (4) imperfect invagination, with incomplete drainage of the stump, on account of the cæcal wall being thickened and stiffened with inflammatory exudate."

I have not had an opportunity of examining, post mortem, the stump treated with the hæmostatic forceps, but have observed clinically that during the reparative process there was no immediate exudation that could be detected; neither have there been any remote exudates found on examination that caused pain. The recovery has been complete and permanent. This is as might be expected, from the fact that the lumen of the tubes and blood-vessels is completely obliterated by compression and heat, and does not, in fact can not, reopen. That complete disorganization of the mucous membrane of tubes or vessels and permanent closure of their lumen are effected has been demonstrated in many experiments.

This experience in ovariectomy and kindred operations led me to expect equally satisfactory results in appendicectomy, and my expectations have been fully realized in practice. In fact, this method of treating the stump of the appendix has special advantages in being the only satisfactory way of controlling hæmorrhage in softened septic tissues.

In salpingotomy, ovariectomy, and appendicectomy the surgeon often finds that the pedicle or point of separation is diseased, and the ligature is likely to cut the tissues if made tight enough to close the vessels; and if that is not the case the stump is infiltrated with septic material, which causes trouble no matter how sterile or aseptic the ligature may be. With the hæmostatic for-

ceps the vessels and lumen of the tube or appendix, as the case may be, are completely closed and the stump thoroughly disinfected at the same time. I have had abundant opportunities to prove the advantages of this method of controlling bleeding vessels in pelvic surgery. I am now using it in other branches of surgery with equally satisfactory results.

The following case history is given as reported by my clinical assistant, Dr. Erdmann:

W. S. P., aged thirty-two years; a New York merchant, of medium build, active disposition, neurosanguine temperament, regular habits, primary assimilation and ultimate nutrition good. Physical examination reveals apparently perfect health. Complaint is made for the past month of a dull ache in the right iliac region, usually merely annoying, but at times severely lancinating and markedly distressing. There are no other symptoms, either gastric or intestinal, except that the bowel is inclined to constipation.

A physical examination was easily made because of the laxity of the abdominal wall, and revealed a small movable tumor in the region of the appendix.

The patient's condition does not prevent his continuance in the regular duties of his business; yet, in view of a history of six other similar attacks, he seeks relief from the pain and mental disquiet by operative procedure.

The patient enjoyed good health until two years ago last fall. The first attack was provoked, apparently, by a bath taken immediately after dinner. The local symptoms were typical of an inflammatory condition of the appendix vermiformis. The pain at first was general over the abdomen, beginning in the epigastrium, but soon became localized in the right iliac fossa. After four or five days of rest and medication relief was obtained, and the regular business duties were resumed. In February, 1896, while suffering from a severe cold, a second attack prostrated the patient. At this time the

pain was at once localized in the region of the appendix, and recovery under treatment was retarded for nearly two weeks. Again, in May, 1896, after partaking heartily of lobster, the patient was seized in a similar manner for the third time. On this occasion his condition was deemed so critical that he was advised to submit to an immediate operation. After nine or ten days, however, he was relieved by medical treatment, and in a short while was able to attend to his business duties. Six months later, Thanksgiving day, 1896, an extended railroad trip was suddenly interrupted by a fourth attack similar to the preceding ones. This was followed by a fifth in February, 1897, and a sixth in May of the same year.

The attacks were all similar in their onset, nature, and course. The pain came suddenly, without any premonitory symptoms, and after the first time it was at once localized in the region of the appendix; there was no gastric disturbance except a slight nausea, nor intestinal, except tympanites; relief followed the exhibition of opium and local hot compresses. At the present time of comparative quiescence, and while he is yet in first-class condition to bear an operation, the patient has at last consented to the repeatedly advised surgical interference.

The operation was done January 11, 1898, by Dr. Skene. For the first time in the history of appendicectomy the method of operating with the electric hæmostatic forceps was used. This departure from the current methods of ligature, suture, cauterization, invagination, and others is the logical outcome of the success of Dr. Skene's practice when operating upon the pelvic viscera. All the other steps of the operation were such as are advised by surgeons generally. The incision was the ordinary one over McBurney's point, two inches in length. On inspection, both the appendix and the meso-appendix were found to be much enlarged and thickened, and superficially traversed by numerous dilated blood-vessels. There were no adhesions. The first grasp of the forceps was upon the meso-appendix close to

its mesenteric attachment. A current which heated the forceps to 180° F. was then induced for half a minute. Upon removal of the forceps the tissues were found to be not charred but dried, having the appearance of white horny matter. Scissors were used to bisect this desiccated area. A second seizure was made upon the appendix itself close to the caput coli, and the same current continued for ninety seconds. The forceps was then removed and the tissue divided in the line of the desiccated area away from the caput. The same result was manifested. No charred tissue, no bleeding, and, more important than all, no escape of the contents of the appendix. The tissues had simply been dried out. Just at this point a rather violent attack of retching came upon the patient, which continued for nearly a minute, yet without inducing any change whatever in the stump. All the severe pressure and strain had not forced even a speck of blood or serum into the compressed area.

The abdominal cavity was left perfectly free from any foreign matter whatever. Sutures and dressings as usual. Time of operation, fifteen minutes.

Anæsthetic, Schleich solution No. 3 nine drachms. Time for induction of narcosis, seven minutes.

The specimen measures seventy-five millimetres in length and forty-five millimetres in circumference and is of an irregular S shape. The contents were about a drachm of pus, mucus, and broken-down cellular tissue. The meso-appendix is also much thickened, even to ten millimetres, and its greatest width is twenty millimetres.

A microscopic section made shortly after the operation, according to the Johns Hopkins "fifteen-minute" method, confirmed the diagnosis by exhibiting the typical structure of an old recurrent hypertrophied inflammatory change.

The convalescence has been unmarked by any complications due to the operation. When the sutures were removed after a week the parietal wound was perfectly dry and clean. At the close of another week the patient was sitting up, enjoying his newspaper and cigar, and was discharged from our care on the seventeenth day.



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FRANK P. FOSTER, M. D.

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